Title: Reach The Beach

Link to Outcomes:

- **Problem Solving** Students will demonstrate problem solving ability in mathematics, including problems with open-ended answers, those solved in a cooperative atmosphere, and those solved by using technology.

- **Communication** Students will demonstrate the ability to communicate mathematically. They will read, write, and discuss mathematics with language and the signs, symbols, and terms of the discipline.

- **Reasoning** Students will demonstrate the ability to reason mathematically, conjecture, gather evidence, and build arguments.

- **Connections** Students will demonstrate the ability to connect mathematics topics within the discipline and with other disciplines.

- **Estimation** Students will demonstrate the ability to apply estimation strategies in computation, with the use of technology, in measurement, and in problem solving.

- **Measurement** Students will demonstrate and apply concepts of measurement using standard and customary units, estimate and verify measurements, and apply them to interdisciplinary and real world problems.

- **Number Sense & Numeration** Students will demonstrate the ability to solve problems using arithmetic operations with technology, where appropriate.

- **Whole Number Computation** Students will demonstrate the ability to describe and apply number relationships using concrete and abstract materials, choose appropriate operations and describe effects on operations on numbers.

- **Statistics & Probability** Students will demonstrate the ability to collect, organize and display data and interpret information obtained from displays. They will write reports based on statistical information. Students will demonstrate the ability to recognize numerical relationships and generalize a relationship from data.

Brief Overview:

This interdisciplinary math, social studies, and science unit focuses on real world activities with mathematical connections, using hands-on experiences, pencil and paper, calculator work, allowing for both creative expression and evaluation during problem solving.

Grade/Level:

Grades 3-5 mathematics, social studies, science

Duration/Length:

This unit should take 3-5 one-hour periods over as many days, depending on the background of the students. Add 2 more days if the field trip is taken.

Prerequisite Knowledge:

Students should have prior knowledge of the following skills:

- map reading
- computations (all operations)
- measurement
- money
- time
- calculators
- format of a friendly letter
- tables, charts, and graphs

Objectives:

Students will:

- estimate and measure distance between two destinations.
- collect and organize data.
- perform number computations
- calculate time in problem solving.
- record, display and analyze data.
- justify answers using data, mathematical reason and value judgements.
- communicate mathematically using oral and written language.
- choose appropriate technology and manipulatives in problem solving.
- relate mathematics to real-world situations.
- evaluate self and others within co-operative learning groups.
- apply meanings of vocabulary words within the unit.

Materials/Resources/Printed Materials:

For Procedure 1:

- Acrostic Poem (attached) or other favorite beach poem
- Large chart paper
- Markers

For Procedure 2:

- Task Sheet #1
- State map
- Rulers
- Highlighters
- Student Worksheet
- Calculators
- Group chart
- Current local gasoline prices

For Procedure 3:

- Task Sheet #2
- Calculators
- Judy clocks
- Money manipulatives

For Procedure 4:

- Task Sheets #3 and #4
- Beach reference materials
- Crayons
- Markers
- Paints
- Scissors

For Procedure 5:

- Task Sheet #5
- Calculators
- Money manipulatives

For Procedure 6:

- Task Sheets #1, #2, #3, #4, #5, and #6
- Rubrics
- Calculators
- Clocks
- Money manipulatives
- Student Evaluation Form

Vocabulary Words for this unit:

destination	estimate	municipal	economical
pit stop	vehicle	indigenous	calculator
transportation	destination	calculation	mpg
mph			

Development/Procedures:

Procedure 1:

- Read the acrostic poem. Ask students where they are traveling to, and what will be found there. Use prior knowledge and references from the poem.

- Brainstorm for items found along the beach. List them on a chart (transfer information from the chart to Task Sheet #3) . Make copies of Task Sheet #3 for each student, with student responses listed under ITEM column for Procedure 4. Explain that the items are important in preparing for the trip because the class will participate in a beach design contest when it arrives.

- Ask students what planning a trip to the beach involves. Teacher elicits a list of preparations. Suggestions should include transportation, cost, food, and parking fees.

- Arrange students in cooperative learning groups and complete all tasks within these groups. Individual assignments include contest design and final assessment of total cost for trip.

Procedure 2:

- Estimate distance from home to the beach, then compute the actual distance using the map scale. Mark shortest route to the beach on the state map using a highlighter. Record actual distance to the beach on the class chart. Distribute Task Sheet #1 to each student. Use calculators if appropriate.

Procedure 3:

- Distribute Task Sheet #2 to each student. Use calculators, Judy clocks and money manipulatives when appropriate. Work in groups to complete Task Sheet #2.

Procedure 4:

- Distribute copies of Task Sheet #3 to all students. Have them verify if items on sheet are indigenous to their beach. Use reference materials and prior knowledge to complete this chart. Ask students which design contest they wish to enter at the beach. Choice includes T-shirt or boogie board design. Distribute contest forms according to their responses. Explain these criteria for designing Task Sheet #4:

  1. Design elements must be taken from Task Sheet #3, except for items listed in the NEVER column.
  2. Design must include at least 3 items from Task Sheet #3.
  3. Design must cover at least ½ of the front surface area.
  4. Design must be colored.

  Collect finish designs for display.

Procedure 5:

- Distribute the Beach Luncheon Menu, Task Sheet #5. Using the menu, each student calculates the cost of lunch. Calculators and money manipulatives are permissible.

Procedure 6:

- Assess students individually using Task Sheet #6, Parts 1 and 2. Distribute summative assessment to each student. Instruct them to refer to Task Sheets #1, #2, #3, #4, and #5 and to transfer information onto assessment Task Sheet #6, writing in complete sentences where appropriate. Have students justify answers with supporting details. Remind students that all 5 parts of a friendly letter must be included, and spelling, punctuation, grammar, and mechanics affect the final grade.

Evaluation:

- Teacher observes co-operative group interaction and individual participation.
- Teacher evaluates task sheets, extension activities, and summative assessment based on accuracy and content according to scoring rubric.
- Student checklist for assigned tasks.
- Student evaluation in form of a letter to a friend detailing the unit.
- Co-operative group evaluation checklist.

Extension/Follow Up:

Procedure 2 Extension:

- Use Extension Activity #1 to calculate fractional distance between two destinations, map directions, and locating routes on state map.

- Use Extension Activity #2 to compare gasoline prices to determine best buy and find difference between cheapest and most expensive cost of gasoline.

Procedure 3 Extension:

- Use Extension Activity #3 to determine travel time based on mileage per hour and rest stop. Calculate parking cost based on actual time spent at the beach due to travel time.

Procedure 4 Extension:

- Design a T-shirt or boogie board using a patterned border outside and a symmetrical design inside border. Items in the design should be taken from Task Sheet #3.

Procedure 5 Extension:

- Calculate the total cost of lunch for everyone in each cooperative group. Find the average cost of lunch for the group.

- Find the cost of lunch for everyone in the room. Arrange the prices from greatest to least. Find the average cost of lunch for the students in your room.

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ACROSTIC POEM

R iding down the road,
E mpty tank of gas,
A nxious to get there.
C harting the route,
H eading towards the beach.

T ime for a break.
H ow much farther now?
E xcitement is growing!

B each parking nightmare,
E ntering contests galore,
A nd stopping to eat some more.
C an’t wait to tell a friend
H omeward bound--- *already?*

Task Sheet #1 Name_____

** use current local prices*

Type of vehicle	*miles per gallon*	*cost per gallon*
sports car		
compact car		
van		

Using the data from the above chart, fill in the chart for each vehicle.

type of vehicle	distance to and from beach	number of gallons used	cost per gallon	total cost
sports car				
compact car				
van				

Which vehicle would be the most economical to use?

_____

Using the above data sheet, which vehicle would you choose to travel to the beach? Explain your answer.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Task Sheet #2 Name_____

You reached the beach! Where will you park your vehicle? Your choices are parking on the street using parking meters, or at the municipal parking lot.

A parking meter costs 25 cents for 15 minutes.
The all-day municipal lot costs $5.00 per day.

You will be at the beach from 10:00 A.M. until 6:00 P.M.
Determine the cheapest way to park your vehicle for the day.

COMPUTATION BOX

Parking meter	Municipal lot

Circle the most economical price.

Task Sheet #3 Name_____

What do we find at our state beach?

Based on your knowledge and the use of resource materials, place a check mark in the appropriate column.

Item	always	sometimes	rarely	never

Task Sheet #5 Name_____

REACH THE BEACH SNACK BAR	LUNCH MENU
ITEM	COST
PIZZA SLICE.....	$1.25
HOT DOG.....	$1.25
HAMBURGER.....	$1.75
BOARDWALK FRIES.....	SM. $.75 LG. $1.00
CHIPS.....	$.75
ICE CREAM.....	$1.50
GIANT COOKIE.....	$1.00
SODA.....	SM. $.75 MED. $1.00 LG. $1.50
JUICE.....	$ 1.50

Write your lunch choices below and calculate the cost for your lunch.

Item Price:

*Total:*_____

Task Sheet #6, Page 1 NAME_____

Final Summative Assessment

How much will it cost you to REACH THE BEACH?

Part 1

A. Enter transportation cost to and from the beach. _____

B. Enter parking cost for the day. _____

C. Enter cost for your lunch. _____

D. Enter total cost for your beach day. _____

E. Consider the total cost for your beach day. Do you feel that this is a reasonable amount of money to spend for a day at the beach? Explain your answer.

_____
_____
_____
_____
_____

F. In what ways would you change the expense of your trip? Evaluate all three expenditures. Explain your answer.

_____
_____
_____
_____
_____

Task Sheet #6, Page 2 Name_____

Write a letter telling a friend about your planned trip to the beach.

STUDENT EVALUATION FORM

"Reach the Beach"

1. What was the most interesting task? Why?

2. What did you like about the task?

3. What would you change ?

4. What was the most difficult task for you? Which one was easiest?

Difficult_____

Easy _____

5. Circle the one that best describes the tasks you have just completed:

Very easy Easy Average Hard Very hard

Extension Activity #1 NAME_____

1. Halfway to reaching the beach, it will be necessary to make a pit stop. Describe your exact location.

_____

_____

2. How far have your traveled from home?

_____

_____

3. What routes have you used?

_____

4. How far is it to reach the beach?

_____

5. What routes will you use on the second half of your trip?

_____

6. In what direction will you be traveling?

_____

Extension Activity #2 Name_____

1. Using the community as your resource, compare the prices of regular gasoline at three local gas stations. Determine the most economical price for regular gasoline in your local area. Use this price in your final calculation for transportation costs.

Cost of regular gasoline

STATION #1_____

STATION #2_____

STATION #3_____

CIRCLE THE MOST ECONOMICAL PRICE.

2. What is the most expensive price for gasoline at the station with the most economical price?

_____

3. What is the difference between the least expensive and the most expensive gasoline at the station?

_____

4. Why do some people choose to buy the most expensive gasoline?

_____

_____

_____

Extension Activity #3 Name_____

Calculating time

Travel time to the beach could alter parking costs for the day. If you leave for the beach at 8:00 A.M. and travel 55 mph, what time would your arrive at the beach?_____

Travel time calculation

Where did you make a pit stop?_____
If you traveled at 55mph, what time did you make a pit stop?_____

Pit stop calculation

How long did you spend at the pit stop?_____
At what time should you arrive at the beach?_____

TOTAL travel time calculation

Based on the total travel time, how much will you spend on parking if you leave the beach at 6:00 P.M.? _____

Parking fee calculation

Holistic Scoring Rubric: Writing a friendly letter

Point values:

4 = Exemplary response
3 = Competent response
2 = Satisfactory response
1 = Inadequate response
0 = No attempt at response

A 4-point letter

-- uses correct letter format (5 parts)
-- shows audience awareness
-- maintains topic focus throughout letter
-- maintains organization throughout letter
-- fully develops paragraphs and indents them
-- uses correct spelling, grammar, and mechanics
-- uses all factual information gathered in this activity

A 3-point letter

-- uses correct letter format (5 parts)
-- shows audience awareness
-- maintains topic focus throughout letter
-- maintains organization throughout letter, but has minor flaws
-- fully develops paragraphs and indents them
-- uses consistent and correct spelling, grammar, and mechanics
-- uses specific information gathered in this activity

A 2-point letter

-- uses correct friendly letter form
-- shows some awareness of audience
-- generally focuses on topic
-- minimally maintains organization
-- indents paragraphs, but does not develop them with specific details
-- generally uses correct spelling, grammar, and mechanics
-- omits specific details from information gathered in this activity

A 1- point letter

-- has omitted parts of a friendly letter
-- shows little awareness of audience
-- focuses poorly on topic
-- does not maintain organization well
-- lacks relevant details in paragraphs, does not indent them
-- infrequent use of correct spelling, grammar, and mechanics
-- uses little of the information gathered in this activity